THE OPTICAL

MAGIC LANTERN

JOURNAL

AND

PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR.

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Notes.

A PRIZE OF A MAHOGANY LANTERN (COMPLETE) will be given by us for the best set of lantern slides to illustrate a narrative which will be found in our next issue (June 1). No entrance fees or conditions, the only stipulation being that the negatives of the successful set shall be sent to this Journal. Look out for particulars in next Journal, ye hand-camera users.

* * *

SEVERAL photographic firms in Glasgow have decided to adopt a weekly half-holiday.

* * *

THE members of the Holborn Camera Club have presented Mr. Benest with a handsome silver match-box, as a slight recognition for his management of the lantern during the past two sessions.

* * *

THE grant of £25,000 originally made for the British Section at the Chicago Exhibition has been increased to £60,000, and it is consequently decided that no charge will be made in this section for exhibitors.

* * *

MESSRS. ROSS AND CO., opticians, are fitting up commanding corner premises next door to their present place in New Bond-street, and the two buildings will shortly be converted into one.

* * *

A NEW lantern lens "multifocal" attachment has been introduced by Messrs. Queen and Co., of Philadelphia, by which it is claimed that the operator can with the same lens obtain either a small or a large picture upon the screen. The attachment is furnished in three powers. Supposing the lantern to be 50ft. from the screen, and a lens of 7in. focus employed, this will give a disc of about 21ft. The size of disc can, with the new attachment, be reduced to 15ft., 12ft., or 10ft., as desired.

* * *

THE *Beacon* speaking of cheap oxygen, says: "One might dream of a time when oxygen gas will be laid on to our houses and when lumps of chalks or lime will take the price of coals.

The firm of J. H. Dallmeyer, which has a world-wide reputation for high-class lenses, has been formed into a limited company. The company having been arranged among the members of the family, shares will not be issued to the public. Mr. T. R. Dallmeyer will, as hitherto, conduct the business.

* * *

Mr. A. W. Scott (of hot air saturator fame) has removed from Weston-Super-Mare, to 401, Cowbridge-road, Cardiff.

* * *

On another page will be found particulars of a new saturator, invented by Mr. Lawson, Rectory View, Newton-le-Willows, Lancashire. The inventor has promised to supply any further information which our readers may desire. We are also informed that should there be likely to be a demand for them, they can be put upon the market at about £2 each.

* * *

An interesting experiment has been lately made by M. Chabry, of the Société de Biologie, with regard to the pressure which can be produced by electrolytic generation of gas in a closed space. While the highest pressure before realised in this way was 6,570lb. to the square inch (447 atmospheres, Gassiot), M. Chabry has succeeded in getting as high as 12,000lb. or 18,000lb. to the square inch; and the experiment was broken off merely because the manometer cracked (without explosion). The electrolysed liquid was a 25 per cent. soda solution. Both electrodes were of iron; one was the hollow sphere in which the gas was collected, the other an inner concentric tube. The current employed was 1½ amperes, and was very constant during the experiment, which was merely one preliminary to a research in which very high pressures were desired.

* * *

A fine set of photographs is on view at the Polytechnic, Regent-street, comprising scenes through which the Y.M.C.A. excursionists will pass next year. Sets of lantern slides from the same subject have also been made.

* * *

A large lens, stated to be of more than fifty times the focal distance of any other lens made, was recently exhibited before the Royal Dublin Society. The lens has been made in connection with lighthouse experiments. Each beam transmitted by the triform apparatus, of which this lens forms a part, measures ten feet horizontally and twenty-two and a-half feet vertically. It is considered that its light of many million candle-power will be, from its enormous volume as well as great intensity, much more efficacious than the most powerful electric light, assisted by the most suitable dioptric apparatus, and it is expected that in fog dense enough to quench the electric light this new luminary will assert itself.

——:o:——

A New Saturator

WHICH IS PLACED IN THE LANTERN.

By W. Lawson.

If one thoroughly understands the principle of the ether saturator, there is no reason why it should be attended with any danger, and those who understand its principles are well aware of the splendid light which can be obtained thereby with but little trouble.

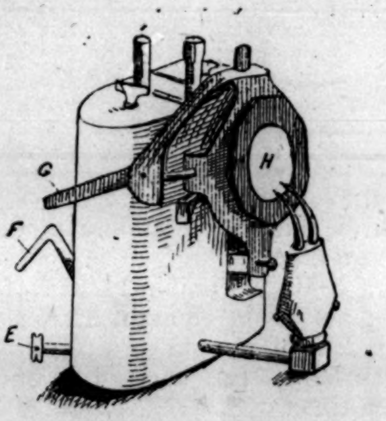
As the outcome of a number of experiments, I have made a saturator which I have submitted to all the tests and conditions to which it is possible to subject it, and I am perfectly justified in saying that it is an impossibility for anyone to make it go wrong under any of the conditions under which the lime-light can be used.

This new saturator is different from any saturator hitherto introduced; it is kept inside of the lantern, and the jet, lime-holder, &c., are actually part and parcel of it. The apparatus consists of a strong brass or copper retainer, which is packed with a piece of blanket. This is charged with benzoline, as will presently be explained. It is fitted with two screw taps or valves, E, which are used for regulating the flow of both the saturated oxygen and the pure oxygen, and by their adjustment it is possible to blow on the lime either all saturated gas, or oxygen. I merely mention this, however, to show that it is possible to control them to a nicety, but when using the saturator these taps are adjusted to suit the requirements for obtaining the best light. As it is necessary to have the saturator heated in order to obtain the best results, the heat generated from the burning lime is utilised for the important purpose of evaporating the ether or benzoline and thus getting the best saturated mixture of gas possible. The relative proportions of this and the oxygen are supplied to the nipples by the taps or valves mentioned.

As the apparatus is contained inside of the lantern, one might be apt to suppose that it will get *too* hot, but I can assure my readers that the hotter it gets the better is the light obtained, and that no possible danger attends this. I have given it every trial possible during the past two winters, and have used it both in and out of doors, and have never had a hitch of any kind, so it will be understood that I am not describing something that has not been well tested. The apparatus I at present use, and which I have sent for inspection to the Editor, Mr. J. Hay Taylor, is larger than necessary, for in the course of my experience I find that it can be made very much smaller, and yet yield as good results as are required for lantern purposes.

With one charge of 3oz. or 4oz. of Commercial Benzoline, the apparatus will work for three hours, and it has been used outside with full moonlight, and also by daylight, so powerful is the light produced. In fact, on Good Friday, early in the evening, I used it in a schoolroom with all the blinds up, a large window at my back, and the screen itself projected for the most part over another window at the other end; but all this seemed to make no difference with the luminosity of the pictures projected upon the screen. This may seem a bold statement to make, but should anyone doubt it, I shall be pleased to furnish the name of place and persons connected therewith.

However, referring again to the apparatus itself, two brass plugs are placed at the top; these are unscrewed when the saturator is to be charged. After pouring in the benzoline a plug at the bottom of the apparatus is removed, and all excess of fluid drained out by blowing through the elbow-pipe, F, at back of the container, to which the oxygen supply is attached. The plugs are then well screwed in.



The lime, H, used is circular in form, and is attached in a ring immediately in front of the container, and adjusted to the nipples by a screw and nut at the back of the nipple holder, until there is about three-sixteenths of an inch between nipples and lime.

The rubber pipe from the oxygen cylinder is next connected to the elbow-pipe alluded to at the back of the saturator, and the gas turned on rather full for fifteen or twenty seconds; then lower the pressure just to hiss and apply a light. For turning the lime cylinder, a ratchet lever, G, is used. This is manipulated so as to thoroughly warm the lime, after which adjust the pressure to suit requirements.

The reader will have observed that I spoke of *nipples.* I use a double nipple arrangement which can be so adjusted that either one or both can be used, although when both are used the best results are obtained. The nipples themselves are adjustable, so that it is possible either to give a very little light spot, or to render the whole lime (which is 2¼in. in diameter) incandescent, should it be desired.

After having used the apparatus, the gas at cylinder is first turned rather low, then the nipples turned away from the lime. The cylinder can then be shut off, and if there is a pop it will scarcely be heard, but even if it was it can do no harm.

Should it be necessary to use the lantern with best results immediately it is lighted, the container should first be warmed before placing it in the lantern.

My opinion is that a saturator of this nature will be used entirely for the lime-light of the future, for the following reasons :—

(1) Only one gas cylinder is used.

(2) The pressure of the gas, &c., is all regulated by one tap, and gives an even pressure.

(3) No other regulator but the regulated tap on the cylinder is necessary.

(4) A better light can be obtained with this apparatus than by any other means at present known (except by electricity).

(5) This apparatus is a self-contained saturator and limelight apparatus in one.

(6) The whole apparatus costs less than a separate saturator, regulator, and lime-light arrangement, and saves the cost of another cylinder.

(7) Only one india-rubber pipe is required, and it will last a long time because only oxygen gas passes through it.

(8) It is perfectly safe, and it cannot be exploded, *even by inexperienced hands.*

(9) It will fit any single lantern with (at most) very little alteration.

(10) It is cheaper to work than any other means of burning the lime-light.

A few more words, and I will conclude. Although with ordinary Commercial Benzoline I get a good light, yet, with a good quality of benzoline, it is much better. Now I am in a country place and cannot always be sure of getting the quality I want, so perhaps some reader will point out some simple means of testing the quality of the ordinary Commercial Benzoline, as it will doubtless be of interest.

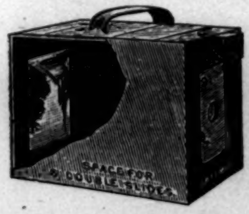
Hand-Cameras for Obtaining Slides for the Lantern.

No.	Camera	Maker		Month	Day	Year
	"Facile" ...	(Fallowfield)	see	March	1st,	1890.
No. 1	"Giah"	(Mawson & Son)	,,	May	1st,	,,
,, 2	"Quadrant" ...	(W. H. Humphries & Co.)	,,	June	1st,	,,
,, 3	"Eclipse" ...	(J. F. Shew & Co.)... ...	,,	July	1st,	,,
,, 4	"Eureka" ...	(W. W. Rouch & Co.) ...	,,	Aug.	1st,	,,
,, 5	"Key"	(Platinotype Co.)	,,	Sept.	1st,	,,
,, 6	"Optimus" ...	(Perken, Son & Rayment)	,,	Oct.	1st,	,,
,, 7	"The Griffin"	(Griffin & Sons, Limited)	,,	Nov.	1st,	,,
,, 8	"The Swinden-Earp" Patent	... ...	,,	Dec.	1st,	,,
,, 9	"Collins" ...	(C. G. Collins) ...	,,	Feb.	1st,	1891.
,, 10	"Kodak" ...	(Eastman Co.)	,,	Mar.	1st,	,,
,, 11	"Guinea" ...	(Walter Griffith)	,,	April	1st.	,,
,, 12	"Vanneck" ...	(Watson & Sons)... ...	,,	May	1st,	,,
,, 13	"Chadwicks"	(W. I. Chadwick) ...	,,	June	1st,	,,
,, 14	"Bonanza" ...	(R. & A. J. Mercer) ...	,,	July	1st,	,,
,, 15	"Repeater" ...	(Cusworth)	,,	Aug.	1st,	,,
,, 16	"Marvel" ...	(Wilson & Son)	,,	Sept	1st,	,,
,, 17	"Talmer" ...	(Talbot & Eamer) ...	,,	Oct.	1st,	,,
,, 18	"The Omnigraph"	(J. Lancaster & Son)...	,,	Nov.	1st,	,,

No. 19—"UBIQUE."

A NEAT, portable, and efficient hand-camera, termed the "Ubique," has been introduced by Messrs. Perken, Son and Rayment, and can be used either in the hand or on a stand. The instrument is provided with three double quarter-plate dark slides, and also a focussing screen, and although the camera only measures 14in. by 6in. by 4½in., two of the double slides and the focussing screen are ingeniously stowed away alongside of the lens, whilst the third is carried in its position ready for exposure. These are all kept in place with springs, so that there is no rattling should the camera ever be shaken.

The focussing is effected at the lens, which is a 5in. by 4in. Rectillinear, and in order to do this or insert a stop, a touch on a spring causes the front carrying the shutter to hinge open. This also enables one to see the method of working the shutter, which is a metal plate provided with a slot, and kept closed by two spiral springs. It is set by pulling a knob in the upper part of camera. The knob and rod are drawn up two inches, and then pushed back into place, when the exposure can be made by touching a spring in front with the finger. A friction appliance enables one by the turn of a knob to give an exposure of almost any desired duration.



Immediately in front will be found a small round screw head for attaching the finder with which each instrument is supplied; this can be used either for horizontal or upright pictures.

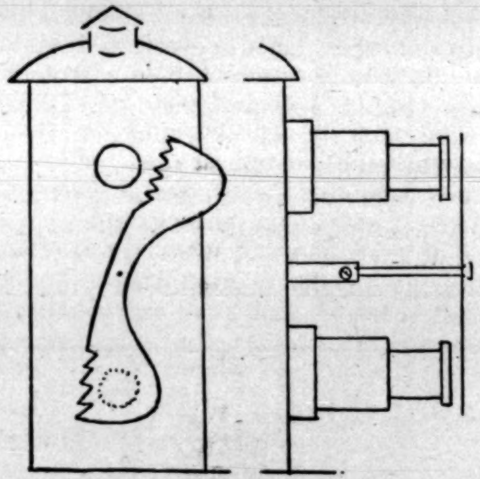
The dark slide is inserted from underneath the camera, and is pushed in until the click of a spring announces that it is in position, and when it is to be withdrawn a touch of a knob causes another spring to partly withdraw it from the camera.

The instrument is covered with morocco leather, and is packed in a waterproof and leather-bound satchel.

Instantaneous Dissolving.

By T. Smith.

IN looking through the April Journal, I noticed an article on pissolvers. May I state that I have made and used the one shown in sketch for about the last twelve months with every success.



It has the following advantages :—

(1) Can be put on or off any moment of the entertainment.
(2) Can be used conjointly with the gas, or not, as may be thought fit. Is thus independent of the gas to a certain extent.
(3) Both lamps can be used at once, or one at a time.
(4) The dissolver at back can be used alone or not.
(5) Can be disconnected at the fan, or at the body of lantern.
(6) Can be adapted to any bi-unial.

A Wrinkle for the Lantern Slide Trade.

By Frank Weeks.

FOR a very small outlay, dealers, producers and others concerned in connection with lantern slides may lighten their labours, save time, and probably increase their business by having photographic prints made of the best and newest slides in stock upon matt surface paper, and mounting them in books of say one hundred in each. Having once got these prints, see how different it is to suit a customer, instead of taking boxes off their shelves, and overhauling various slides (perhaps getting them broken), dealers need only hand one of these books to the customer, from which a selection can more readily be made. At other times they could be laid upon the counter, and customers whilst waiting for other goods may, by looking through them, decide upon buying or hiring slides in addition to their other purchases. Such books would prove much more attractive for shop use than catalogues of titles only.

From my own experience, as a designer and producer of slides, I find that dealers would only be too pleased to take a set of prints to match slides they order. Thus a little business will be made all round; the dealer will save time and breakage of slides, the customer will quickly get suited with what he wanted, and perhaps some pictures which he did not at that time intend to order may take his fancy, and a little business will also be given to the photographer.

A few of my clients to whom I suggested this method originally have tried it, and found it to be a great success. All I can say further to the trade is try it.

——:o:——

Toning Slides with Uranium Salts.

BY ALFRED STIEGLITZ.

(Continued from page 48.)

f. BLUE TONES.

INSTEAD of plunging into a solution of one part of No. 3 and five parts of water, as in *e*, take the stock solution as it is, and allow the slide to remain in that for five minutes, as in the above, after which wash and dry. Continued washing will not harm the slide, but a simple rinse will suffice. The tone attained in this manner is an excellent one for seascapes and moonlight effects especially.

In case the resulting slide after toning is not satisfactory, it is easily brought into its original state by dipping it into a dilute solution of potassium cyanide for a few seconds, upon which the slide regains its original tint. Do not allow the slide to remain in the cyanide solution longer than absolutely necessary to remove the toning stain, inasmuch as the solution is a powerful reducer, and would in short time eat away the whole picture. After having washed the slide, after this operation, it may be re-toned again with any one of the above-mentioned formulas.

In case similar results are wished to be attained with other salts than uranium-nitrate and ferricyanide of potassium, slides can easily be toned brown or red by treating them in the following simple way: After having washed the fixed slide thoroughly, dip it into a concentrated solution of bichloride of mercury until well bleached, after which operation wash for at least ten minutes in running water, and then colour with a concentrated solution of sulphite of soda for brownish tones, or with a concentrated solution of carbonate of potash for reddish ones. The results are generally very fine. This method led me to the following observation: It often happens that the films of slides upon developing with hydroquinone are stained a deep yellow, even orange, and that such slides are only good for covering glasses, after film had been carefully removed from same in either hot water or acid. This is no longer the case. Should the stained slide be good in all other respects, do not throw it away as heretofore, but give it a short bath of bichloride of mercury, which bleaches the colour at the same time that the silver image is bleached. Upon treatment with either ammonia, sulphate of soda, or carbonate of potash, the stain will have entirely disappeared, and the resulting slide will often turn out to be a gem of the collection.

Now a few words as to tones in general.

Except for exceptional cases, I think it advisable not to tone slides, but to try and get the fine brown colour directly in development, a colour so easily obtained by the well-known formula—

Hydroquinone	1 part
Sulphite of soda	4 parts
Carbonate of potash	3 parts
Water	85 parts

using one part of this solution with four parts of water, after having exposed four times as long as would have been necessary to obtain a black tone with the normal developer, that is, one part of the stock solution and one part of water.

For certain effects, though, toning is very advisable, the choice of colour depending entirely upon the good taste and judgment of the slide-maker.

——:o:——

How to Renovate a Lantern.

No. 1.—WOOD-WORK.

BY C. GOODWIN NORTON.

NOW that the lantern season is virtually over it will be well for the lanternist to overhaul and examine his apparatus during the summer months, with a view to putting it in good working order before next winter.

A lantern can, with a very little care and trouble, be made to look almost as good as new; but unless the amateur knows how to go about the renovating process, he will probably only make matters worse.

A mahogany-bodied lantern will, if used with a blow-through jet, be found to have its polish more or less blistered, especially about the top, whereas the brass-work which has been subjected to the same heat is scarcely tarnished. And as the lacquer on the brass-work and the polish on the wood are, or should be, practically the same—viz., shellac dissolved in spirit—it is reasonable to suppose that the wood has undergone some process which renders the polish more liable to perish.

With the cheaper kinds of lanterns it is often the practice to first size the wood and then apply the polish with a brush instead of a rubber, which latter is only used to finish with. This effects a great saving of time and expense, and the work looks quite as well as good French polishing until it is subjected to heat. In order to get rid of the blisters, the whole of the brass-work should first be taken off the lantern, and, if they are not numerous or deep, rubbing them down with glasspaper will be effectual; but if the old polish is much damaged, the whole of it had better be removed, especially if there are any bruises in the wood. There are several ways of doing this—by scraping with a steel scraper, and then rubbing with glass-paper; but it is difficult to get into the corners and mouldings. Another way is by washing with methylated spirit, which is a very tiresome job, and never removes it effectively; or by washing with a strong solution of potash. This is dirty work, but the colour of the wood is much improved by it.

If the mouldings are not elaborate it will be found best to use the scraper and glass-paper; and in order to get into intricate places, such as the moulding on the base, pieces of wood about 2in. long, of suitable width and thickness, should be shaped concave or convex, on which to hold the glass-paper, so as to fit and go into the shape of the mouldings. The internal angles can be treated with a little spirit, and brushed out with a stiff shoe-brush which should, of course, be clean. The potash process will take all the polish off; but as water must be used to remove the potash, this is liable to warp the wood unless it can be done very quickly on a warm day. The woodwork of a lantern should never be exposed to the direct rays of the sun, which will, probably, split and warp it.

On the whole, it will be best to try the scraper and glass-paper first. A scraper is a piece of steel about four by three inches, the same thickness and temper as a hand-saw; in fact, broken saws are often cut into scrapers, but they can be purchased for sixpence. The difficulty is to keep it sharp; very few workmen can make them cut properly.

The edge is first filed perfectly straight and square, then rubbed smooth on a hone. A piece of hard smooth steel, such as a bradawl, is then pressed along the edge, and if it is held nearly square will have the effect of turning it up, thus forming a burr, which is really the cutting part. The scraper is then turned round and the other edge turned over in the same manner. This can only be done properly after a deal of practice.

To use the scraper, it is held at an angle of about sixty, and drawn along the wood in the same direction as the grain. With very hard wood it can be used in any direction. Some workmen hold this tool by placing the two thumbs close together on the side nearest to them, with the fingers in front; others place it in the palm of one hand, and hold the top edge with the fingers of the other.

If the scraper is sharp, and held at the proper angle, it should take off the polish or wood in long shavings, and not merely in dust.

Glass-paper lasts much longer and cuts better if used over a piece of flat cork; or failing that, a piece of wood covered with cloth will do as well.

If the wood of the lantern is dented or bruised the sunken parts should be covered by a piece of wet cloth, and a hot iron applied; the steam generated will cause the bruised wood to swell to its former size again. A common poker will be found convenient for this purpose; it can be made nearly red hot if the cloth is thick and well wetted.

Having removed the polish, and raised the bruises, the wood can be darkened by applying bichromatic of potash, dissolved in water in the proportion of 1 to 20. The water will raise the grain of the wood, and make it rough; it must then be rubbed smooth with fine glass-paper, taking care not to rub the stain into patches. If the colour is not dark enough, try a little stronger solution of the bichromate, or stand the lantern in a good light. It is the light that causes the wood thus treated to darken. When the wood is quite smooth it is ready for polishing.

The materials for French polishing are linseed oil, French polish, methylated spirit, cotton wool and some clean cotton rag, a camel's-hair brush, and the clean shoe-brush previously mentioned. The work should first be oiled all over, and wiped dry. A small quantity of cotton wool is then saturated with polish, and enclosed in a piece of rag: this forms the rubber, which is then passed over the whole work in regular circular movements, taking care not to squeeze out the polish too fast, and continue until the rubber is perfectly dry, when a little more polish is put on the wood, which must be removed from the rag for the purpose. As the polish is gradually deposited on the wood it will be found that the rubber is apt to drag or stick. To remedy this, apply the smallest quantity of oil to the rubber with the finger, and continue the rubbing until the pores of the wood appear to be filled, and then leave off for the day.

French polishing must not be hurried, and only the most experienced workman can polish a small job right off. The amateur will find it a good plan to go over the whole work three or four times, and then to leave it for an hour or two, or even a day, until the shellac has thoroughly hardened.

As the work proceeds the surface will look smeary. This need excite no alarm. The chief things to guard against are (1) using too much oil, which prevents the polish from adhering to the wood; (2) putting on too much polish, which will cause the surface to be uneven, or perhaps dissolve the shellac already deposited and make black spaces in the face of the polish; (3) letting the rubber rest, for even an instant, in the same place.

The mouldings can be touched up with a little polish, applied with the camel's-hair brush.

When the pores of the wood get filled, and the work has rested for a day, it should slightly be oiled all over with linseed oil, and then gently rubbed down to a smooth surface with the finest glass-paper. The oiling is to prevent the glass paper from scratching the polish too deeply, and to prevent clogging. Care must be taken not to press too hard on the prominent parts. The same process is gone through as at the commencement, but less polish and oil are used, and the rubber kept nearly dry.

When it is seen that there is a good surface under the smears, instead of adding polish or oil, put a few (a very few) drops of methylated spirit on the rubber, and go over the whole work very lightly, or all the polish may be dragged off. Continue this until the rubber is quite dry, and there is only a slight smear on the surface; add a few more drops of spirit, and rub with a circular movement until all smears disappear.

These are practically all the directions that can be given. Experienced polishers have many little dodges of their own to attain greater speed, but it is doubtful whether these add to the quality of the work. The real test of good polishing is the bright surface which will not sweat or become spotty after a length of time. A pianoforte polished by the best English makers will keep bright for many years, but these often are in the polishers' hands for twelve months.

The lanternist, therefore, need not despair if his woodwork does not at first shine with resplendent beauty. To keep the rubber moist when not in use, enclose it in a clean lime-tin which has an air-tight lid.

Electric Light for Magic Lantern.

BY PROF. W. C. PECKHAM.

THERE is great diversity of opinion regarding the candle power of both the calcium and electric arc lights. Makers and dealers in the calcium light claim as high as 900 candle power for it as actually used in the lantern. I have made numerous measurements in the laboratory of the Adelphi Academy upon both. The method employed was that of the Bunsen grease spot photometer, with a sight box by the American Meter Co. The standard of light was the Sugg London standard Argand gas burner and a Methven screen, by the same company. These have been compared with standard candles, and are correct, or what is called so. The following table is compiled from my notes, each jet being tested three times: 1. A noiseless flame. 2. A medium flame, making as much noise as would be allowable in the lantern. 3. A roaring flame, taking all the gas it will use.

CALCIUM LIGHTS.

Jet.	1	2	3	
A	304	304	413	candles.
B	130	205	413	„
C	264	304	491	„
D	264	304	353	„
E	180	—	304	„

Column 3 gives the maximum beyond which these jets cannot be forced, and which they cannot long maintain, since the lime would soon crumble away under such a bombardment.

A calcium light which had just been tested with a quiet flame, was used as a standard by which to measure the candle power of the two arc lights for lantern use belonging to the Adelphi Academy, with the results given below.

A small lamp made by the United States Electric Lighting Company, requiring about 8 amperes at 110 volts, gave 355 candles. A Clark lamp of full capacity, with a current of about 15 amperes, gave 1,378 candles, and with a full current of 20 amperes on, gave 1,758 candles. These figures show that candle power is much overestimated in all cases. The last lamp measured is what is called a 2,000 candle power lamp. It gives, in the condition in which it would be used, 1,300 candles, and this is a magnificent output when compared with the 300 candles of the calcium lights.

In many places current can now be had from lighting and power circuits, while many educational institutions have their own plant, which could easily be employed for this purpose; but as yet no arc lamp of moderate price equal to the work has been put upon the market. Not to mention the old regulators, like the Foucault, with clockwork which requires frequent winding, there are several lamps, costing about one hundred dollars, made for this use; but that price for the lamp alone is prohibitory to many. English writers recommend the Brockie-Pell lamp most highly. The Clark lamp, spoken of above, is a favourite here. It, however, is hung down into the lantern, resting on the top of it. Its regulating magnets and mechanism are heavy, rendering the whole somewhat top-heavy. To adjust the light one must reach above the top of the lantern, and if the lamp is to be removed from the lantern, a special stand must be provided for it. The lamp I have used for nearly two years was made by the United States Electric Lighting Company. It is simple in construction, rising by a rack and pinion by hand, as the lower carbon is consumed to bring the arc into focus again. Its fault is that it does not "take up" quickly when the current varies through varying resistance in the arc. With a little experience, its regulation by hand, to overcome this defect, is not difficult.

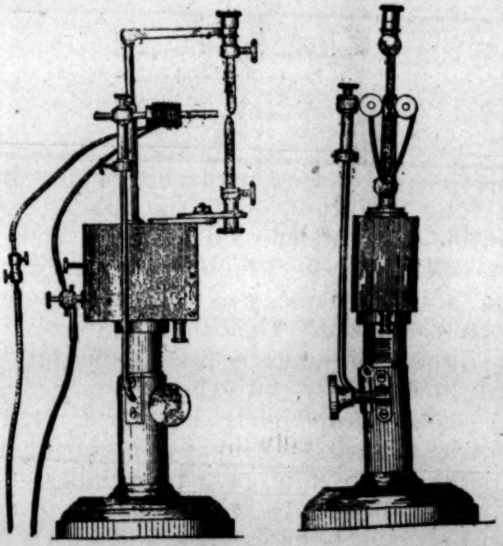


Fig. 1.

Fig. 1 shows the appearance of the lamp and its interior mechanism, the sides being removed for that purpose when the photograph was made. It stands 20in. high, with full length of carbons.

It would seem that a focussing lamp might be made for a moderate price which would, with plain, strong, and durable workmanship, be as good practically as the highest priced lamp, and that such a lamp would find a good market.

The incandescent lamp has been used in the lantern by some. In its ordinary form, with a long loop of filament, the light is too widely distributed. A special form has been made for the lantern of 100 candle power. The carbon filament was coiled into a close spiral of about a half-inch in diameter, which is about the size of the white spot on the lime. This lamp is very easy to use, since its resistance would be fitted to the circuit upon which it was to be put, and it would run with the other lamps upon the same circuit, and with no more attention. The operator has nothing whatever to do but to turn the key when the light is wanted. Where its light is sufficient, nothing better can be desired, nothing cheaper be found. The lamp itself costs very little, and a support for it in the lantern can be made by anyone. It is infinitely better than any oil lamp. I have known them to be used in small lecture rooms in preference to the calcium or the arc light. But it is the arc light alone which can take the place of the calcium light for all uses. It leaves nothing to be desired. I cannot agree with the remark of Mr. Lewis Wright, in his recent book on "Optical Projection": "Such a powerful light is quite useless for exhibitions, unless the disc shown exceeds 30ft. in diameter." My experience is that the better lighted a picture is the less the eyes of the observer are taxed. With the calcium light the deepest darkness is necessary in other parts of the hall to save the picture from indistinctness, and the reading lamp of the lecturer often blurs one side of it. When the arc light is used, the illumination is so abundant that enough lamps, gas or incandescent electric, may be left lighted to enable the audience to see the lecturer, and the lecturer to see his audience, so that notes may be taken or a manuscript read, while still the picture can be better seen in all its details than with any other artificial light. The ability to have other lights in the lecture room is sometimes an important consideration in controlling an audience of students. It is useful always. I often project a slide of a diagram or a machine, without wholly darkening the room, and go on with recitation or lecture upon it, while the class attend, copy, or take notes, as required. In a popular lecture it is far pleasanter. Nothing is more weird for an audience than to sit in deep darkness and listen to a voice coming as from an abyss beyond; nothing more unreal for a speaker than to stand upon a platform and to speak into darkness in which there may be supposed to be interested listeners. With the arc light in the lantern, all this is changed, and speaker and hearer may be *en rapport* with each other in a fairly-lighted room.

If the operator is on an arc light circuit, his lamp is put directly in series with the others on the same circuit; but the high potential used on such circuits makes such an arrangement rather a ticklish one to work with. The low potential generally used with incandescent lights is more safely handled, and there are now many arc lamps used on such circuits. The potential is never above 110-120 volts. At this pressure the wires may be handled as safely as those from a battery. Of course they must not come in contact with each other; for a short circuit will produce a great heat.

If the arc lamp is to be used on an incandescent circuit, additional resistance is required to enable the low resistance arc lamp to burn in multiple with the high resistance incandescent lamps. Arc lamps use from 8 to 15 amperes of current at 115 volts. Apply Ohm's law to this, $C = \frac{E}{R}$ or $R = \frac{E}{C}$, and we have $\frac{115}{8} = 15$ nearly, and $\frac{115}{15} = 8$ nearly. So an 8 ampere lamp requires 15 ohms, and a 15 ampere lamp 8 ohms approximately of resistance to control the current.

A part of this is offered by the arc itself. The adjusting coils of the lamp furnish something more, differing in different lamps; but not enough to make up the resistance to the amount required to choke off an excessive current through the lamp.

There are two ways of arranging the apparatus.

1. The common way is to place a rheostat in the main circuit, whose resistance can be varied at will, and thus more or less current be sent through the lamp. This is the method when the current comes from a central station at a constant pressure.

2. Where there is a separate or isolated plant, as in not a few educational institutions, a coil of No. 12 German silver wire (so that it will carry the required current without heating, with a resistance of three or four ohms) may be put permanently in series with the lamp. The remaining adjustment will be made by the field rheostat of the dynamo. For this purpose, the field wire should be brought to the lantern table, and a field rheostat be connected to them within reach of the operator. By varying the field resistance, he can change the voltage of the current, and thus adapt it to the lamp.

The only defect of the arc light for lantern use is the "blinking" caused by the change of the position of the bright spot on the positive carbon. This bright spot emits by far the greater part of the light. To see it, place a deep red and a blue glass together, and look through both. The bright spot still looks white, but the rest of the carbons looks dark red. This spot is seen frequently to move, sometimes to swing around, sometimes to jump across to the opposite side of the carbon. This motion is attributed to impurities, principally silicon, in the carbon. The best carbons, the Carré French carbons, are not free from this defect.

The blinking does not make much difference for street use. The light flickers and hisses, and we endure it; but in the lantern, if the arc goes to the back side of the carbons, the picture is blurred or obliterated entirely. This motion of the arc is fatal to the use of the light for projecting microscopic objects. The light entirely leaves the focus of the objective, and comes back when it gets ready. Several microscopic societies have abandoned the arc light in disgust on this account, though when the arc is in its proper position, the illumination is superb.

The remedy for blinking has been to place the centre of the negative carbon in front of the positive by a distance equal to its radius. This serves two purposes. The distance from the tip of the negative carbon to the front side of the positive carbon is the shortest and easiest path for the arc, and so the arc will remain in front of the carbons, unless something makes it move. A second object which is gained is to form the crater in the positive carbon so that it slopes towards the condenser, as shown in Fig. 2.

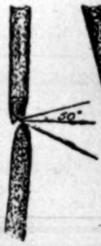


FIG. 3.

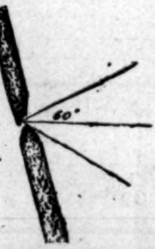


FIG. 2.

In street lamps the axes of the carbons are placed in the same vertical line. The crater tends to be horizontal, and the light is radiated downward and equally all around, as it should be. This is just what is not wanted in the lantern. The position shown increases the amount of light sent out toward the condenser and screen. Carrying this idea still farther, lamps are made in which the carbons are set on a slope of about 20deg., in which position the negative carbon cuts off but little of the light from the crater of the positive carbon, as is seen in Fig. 3. A comparison of Fig. 2 with Fig. 3 shows an angle of opening between the carbons 10deg. larger in the inclined carbons, although both figures are made from the same negative.

According to my observation, this is but a partial remedy for the defect of blinking, and I have devised and constructed a special regulator for holding the arc in its proper position, which, so far as I know, is new and original, and which has proved successful.

The fact that a magnet strongly repels an electric arc is of course well known.

The same force, in a less degree, will hold the arc on one side of the carbon. At first, one pole of the electro-magnet was used. This worked quite well. The apparatus illustrated in Fig. 4 was afterwards made, which is an electro-magnet of the ordinary form, except that the soft iron cores extend beyond the coils, so that the coils may be set back far enough that their insulation may not be destroyed by the heat. The cores are of ¼in. rod, 2½in. long, and set 2in. apart. Eight to twelve turns of No. 12 wire on each core will produce a field strong enough when the poles are set about a half-inch behind the carbons. The mode of attachment to the lamp is plain from Fig. 1. It will be seen that the rod which carries the regulator is attached to the base of the lamp, and that the magnets can be moved forward and backward. If too near, they drive the arc out with a hissing noise. The regulator is adjusted once for all as high as the focus of the condenser, and as the carbons consume, the rack and pinion brings the arc up to its place again, with reference both to the regulator and condenser. The regulator is in series with the lamp and the whole current goes through it. It might be in parallel, but nothing would be gained by that arrangement.

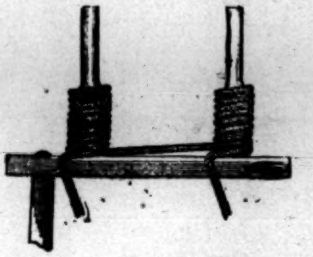


Fig. 4.

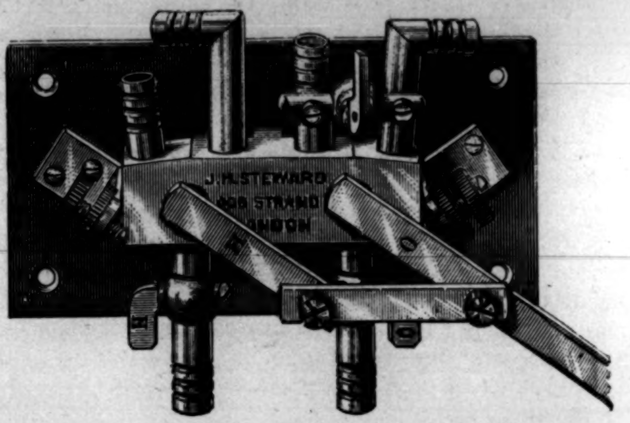
I have had it in use for more than a year, with the best results. Anyone can easily make one and test its working. It is confidently expected that it will enable the arc lamp to come into use for lantern projections wherever the heavy current can be had.—*Sci. Am.*

——:o:——

New Double Plug Gas Dissolver.

It is sometimes found that the plugs of some dissolvers work loose and the oxygen gas is liable to pass to the hydrogen, or *vice versa*, and then a pop or explosion in the tube of jet or india-rubber may result, and the light go out. We witnessed an exhibition a fortnight ago where considerable delay was caused by some failure with the dissolver, and no doubt it was either due to this loosening of the plug or want of proper adjustment of the slots in the respective sides of the plug. This latter is of great importance, so that the hydrogen gas may come through at the proper time and not be overpowered by the oxygen.

With a view to get very exact adjustments for the by-pass so that enough hydrogen may come through when using the blow-through jet, and not too much when using the mixed gas jet, Mr. J. H. Steward, of the Strand, W.C., has introduced a double plug dissolver with fine screw adjustments and locking nuts to form the by-pass. This dissolver, having perfectly independent supply tubes, plug and outlets for each gas, it is impossible for the gases to get mixed. "The taps on the supply pipes are for shutting off the gas completely, if desired, but more particularly for turning the hydrogen down to a bead, so as to just keep it alight after once the operator getting his apparatus all ready to work. When the lever handle is over to the right, the *right* hand of the two outlet pipes is open both of oxygen and hydrogen gases, and when to the left, the left-hand respective outlets. The cross tap or by-pass on the oxygen outlet pipes is for use with blow-through jet where a little oxygen is advantageously used with the hydrogen in the bead.



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The Way to Dispose of a Lantern Outfit.

He had been on the road for some time; business had not been good of late—bad weather, strikes, general sickness; and not feeling the best himself, he decided that to get out now was the thing—but how to do it was the question. To sell to a second-hand dealer for next to nothing went against the grain, and there was plenty of grit in his grain; so he put on his thinking-cap, and conjured up this scheme—

Having travelled that whole section of the country thoroughly, he was well acquainted with the people, knew the live towns from the dead ones, and decided that P—— was the city that could put him on his feet.

He took the best hall in the place, billed the town, visited the prominent ministers and important personages, placed passes where they would be of service and used, and he packed his house regardless of expense, and threw his whole soul into his show, and felt that he had outdone himself—his profit was nothing, his expectations great; but his scheme was not yet ripe.

The second night's audience proved by its number that his plan was working well—more pay tickets meant a class that felt some genuine interest in the show, and he was shrewd enough to know that in such a class he would find the man he wanted. So just before the entertainment closed he had the lights put up, and informed the audience that something of importance was to be imparted to them. That no other exhibition would be given in that hall until the evening of the day one week hence, that the price of admission would be — that each ticket would be numbered, that a certain number would be placed in the hands of Mr. S——, a reliable man and well-known citizen, and the person who purchased the ticket having upon it the number corresponding with the selected number, should have the whole outfit; the number would be printed on the ticket, so that it could be detached when presented at the door, and retained by the purchaser.

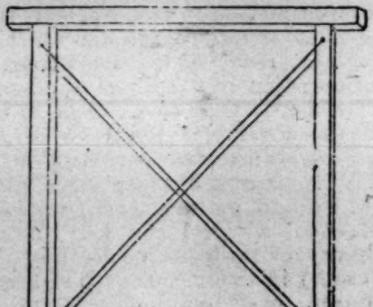
This announcement, as here stated, was advertised in the papers for the balance of the week, and the result was marvellous; the whole town was worked up, each speculator and would-be lantern man bought as many tickets as his courage and pocket-book permitted, and the result was a net income of a sum far above the full value of a new outfit.—*Exhibitor*.

——:o:——

Screens Out of Doors.

By Geo. Marsden.

One of the difficulties in showing lantern pictures out of doors is, that when using a screen a very slight breeze causes the fabric to become bulged, and consequently destroys the sharpness of the image depicted. I have used a very simple yet effective arrangement, whereby the defect is to a great extent relegated to the past. The annexed sketch will about describe itself. I place my lantern at one of my windows, and have a frame (as shown) erected on a portion of the building which juts out below. On the frame I have four wires, and stretch the screen between them, and am enabled to project pictures, &c., for advertising purposes, irrespective of weather. The wires, of course, answer to keep the screen within bounds.



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Editorial Table.

Holder for Gelatine Slides.—Mr. Albert Tranter has sent one of the holders he uses for the gelatine slides which he described on p. 43 of our last issue. Two slide-cover glasses are bound on three sides in the usual manner with needle paper. The fourth side is bound with thin leather, such as bookbinders employ. When all the binding is quite dry, the paper is cut at the junction of the glass, leaving the edge bound with leather intact, so as to serve as a hinge. The slide can thus be opened, and a gelatine film inserted, when it can be treated as any ordinary slide, and inserted in a carrier. Two such holders used in conjunction with a lightning carrier will enable a collection of gelatine slides to be shown to the best advantage.

——:o:——

Correspondence.

LIME CUTTING.

[*To the Editor.*]

Sir,—Can any reader give the commercial method of lime turning? Is it done with some kind of cutter that cuts the lime into circular form at a few revolutions of the lathe, and drills the hole at same time?—Yours, &c.,

Anxious.

PALE BLUE GLASS.

[*To the Editor.*]

Sir,—In answer to Mr. Lowe's letter concerning a tinter, my advice is, do not buy one. Some time since I bought a handsome brass-mounted revolving tinter with four colours. It was more than useless. It blotted out the picture. Since then I have bought seven shades of gelatine, 8in. in diameter, mounted in white cardboard, for fourpence each. They use these in pantomimes.—Yours, &c.,

R. Goddard.

Bankfield, Singleton, Poulton-le-Fylde.

[*To the Editor.*]

Dear Sir,—Your correspondent Mr. Lowe will most probably be able to procure some small pieces of stained pale blue glass at some stained window-glass factory. But I would suggest that Mr. Lowe should procure some transparency oil colour, and paint the glass to the required shade, and let you know for the June issue of your Journal in what way he obtains the best result, for the benefit of your numerous readers.—Yours truly,

Rye. W. Stocks.

[*To the Editor.*]

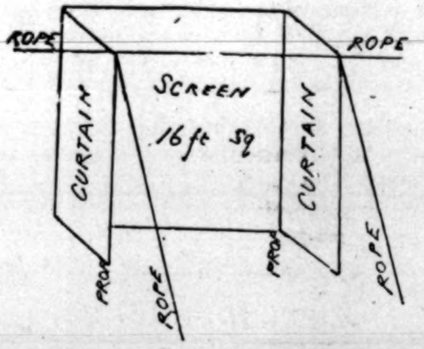
Dear Sir,—Seeing Mr. Lowe's letter in the April number of *Magic Lantern Journal* for pale blue glass, as a lanternist I think he will find it a lot more satisfactory if he used coloured films of gelatine, which he will be able to procure from Messrs. Silber and Fleming, 57, Wood-street, London. They are sold in one shilling packets of six colours, "two of each colour." I always use them myself in preference to glass.—I am, Sir, yours truly, R. R. BARRETT.

Truro.

LANTERN IN DAYTIME.

[*To the Editor.*]

DEAR SIR,—In reply to your request for information *re* exhibition (page 50, April), I beg to state that all passed off better than I expected. I fixed screen at end of room, and made frame fast to two staples. I then fixed two ropes at each top corner of frame, and brought them over line props seven feet away from screen. Another rope fixed with staples to opposite walls and across props kept them in position. Over the sides and top I put two pairs of damask curtains (end for end stitched), six feet wide. With this I got a very fair picture. The following sketch will describe my meaning:



As I have received so much benefit from *Lantern Journal* myself, I am very pleased to be able to furnish any information that may be of use.—I remain, yours faithfully, ALFRED H. SAUNDERS.

Brierley Hill.

AN ACKNOWLEDGMENT.

[*To the Editor.*]

SIR,—I find that the tables relating to the sizes, pressures, capacities, and contents of gas cylinders, given by me in *The Optical Lantern*, page 52, is the copyright of the Scotch and Irish Oxygen Co. I copied the table, with slight alteration, from the "Indispensable Handbook," and acknowledged the same; but as no statement is therein made about copyright, I could not know that the table was so protected. As, however, it is copyright, I gladly acknowledge the ownership.—Yours, &c.,

ANDREW PRINGLE.

Notes and Queries.

A. H. Hignett.—We note your particulars of the probable causes which would make the Duplex regulator fail to act. We are quite familiar with the inside, and find the rubber stout and pure. Should such as you describe happen, the outlet is quite sufficient to carry off the pressure. Respecting your remarks about particles of dust sticking in the valve, we would remind you that the valve is cone-shaped, and that it closes against the pressure, consequently any particle of matter that passed the neck would speedily be blown past the cone.

W. T. Askew.—Replied per post.

F. W.—No photographic exhibition will be held at the Crystal Palace this year.

J. Penketh writes: "I have a three-wick lamp, in which I burn paraffin oil. I find after using the lamp about half-an-hour the condensers get almost red-hot; in fact, I have broken the lens nearest the lamp. (1) The chimney is 8in. high; is it too short? (2) Will salt added to the oil, with a little camphor in, improve the light?" *Reply.*—(1) Increase the draught by lengthening the chimney. (2) Mr. Albert Tranter writes to say that he has found it very beneficial to soak the wick in vinegar. We have added salt, and given it a careful test, but fail to find it any advantage. Camphor improves the light, but it soon clogs the wicks.

L. E. asks "(1) Why do Pumphrey's lime discs give more light than lime cylinders? (2) Is Beard's Eclipse carrier spoken of so highly by Mr. Stevenson the same as Chadwick's? (3) Is there any simple way of concentrating the light from a bi-unial upon, say, one figure in a group?" *Reply.*—(1) Because a larger surface can become incandescent. (2) No; they are different in every particular. (3) Use a long focus lens, or do without the objective, and use only one glass of the condenser—that next the light.

J. Knight writes: "I have been trying to turn some limes, but it generally ends in failure by going to pieces. What is the best kind of chuck to hold the lime in whilst turning"? *Answer.*—You will find it best to reverse the operation by allowing the tool to revolve, and applying the lime to it. The tool may be made by cutting saw-like teeth on the edge of a thin piece of tubing, and is known as a periphery saw.

Geo. Dewing.—See article on another page. It will explain all about taking the polish off the lantern.

T. R. L.—Thanks for your sensational article, headed "Lantern Explosion and Panic at the People's Palace." We were sitting six feet from the lantern on the evening in question, but failed to see the wonderful sight you appear to have done. We certainly did see an indiarubber pipe blow off the end of jet, which caused a short delay whilst it was being replaced. The only part of your article with which we agree is that when halls are lighted with electricity; it would be a good plan for the lantern operator to control the switch from his stand. You give neither name nor address.

Muddler says he uses one of Clarkson's rubber-wedge regulators, and asks what is the matter with it as it behaves as follows: It was attached to 40ft. cylinder, taps at lantern closed; when valve opened, regulator distended (unwillingly). After using gas for half hour, bag slackens, light becomes irregular (when both lanterns used) and eventually light fails. He gauges cylinder and finds 32ft. of gas in it. *Answer.*—From your description we should say that this strange behaviour was caused by an obstruction in the tube before reaching the valve, and if you send it to Messrs. Clarkson, with this paragraph, they will doubtless rectify it in a short time.

Hymns writes: "In copying hymns, diagrams, &c., the negatives of which I desire to use from to make lantern slides, I find the absolute necessity for dense black and clear whites. After many patient trials, Ilford, Thomas (E. R. and T. C.), Barnet, Mawson's, &c. plates, all sorts of exposures, I cannot get this density unless I intensify. Lately, by Mawson's advice, I tried their Photo-Mechanical Plates. I have now wasted three dozen of these (thirty-eight to be exact) in experiments, tried again long and short exposures, over developing (whites clogged) under developing (whites clear but blacks thin), but no how can I obtain the density other people get." *Answer.*—Try a liberal allowance of bromide, and an excess of pyro in the developer; the former will keep the whites clear, whilst the latter will give density.